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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/612,260	07/07/2000	Guy M. Cohen	YOR9-2000-0174	7116

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EXAMINER

KANG, DONGHEE

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 01/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/612,260

Applicant(s)

COHEN ET AL.

Examiner

Donghee Kang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 November 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Acknowledgment*

1. Applicant's Amendment and Response to Paper No.11 has been entered and made of Record. Claims 1-20 are pending in this Office Action.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims **1, 4, & 7-8** are rejected under 35 U.S.C. 102(b) as being anticipated by Wong et al. ("self-Aligned (Top and Bottom) Double-Gate MOSFET with a 25 nm Thick Silicon Channel", IEDM 97, pp 427).

Wong discloses a transistor comprising (Fig.4g):

a channel region; a first gate on top of said channel region; a first gate dielectric below said first gate and a second gate dielectric above said second gate; a second gate below said channel region, wherein said first gate comprises a different thickness than said second gate; and an isolation layer below said second gate, wherein said first and said second gate are electrically separated from each other and said first gate, said second gate and said channel region form a planarized structure. See also *Device Fabrication*.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims **2-3, 6, 9-16, & 18-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wong.

Regarding claims **2-3 & 12-13**, Wong teaches substantially the entire claimed structure, as explained in claim 1 above, except that the first gate comprises a different doping concentration than said second gate. It is, however, well known in the art to select the concentration of gate electrode to adjust a threshold voltage in the transistor. If the first gate electrode has a lower concentration than the second gate electrode, a threshold voltage of the first gate is lower than that of the second gate. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed Wong's "first and second gate" having a different concentration, since the different concentration of gate electrode provides the different threshold voltage in device.

Regarding claims **6, 9, & 15**, although Wong does not teach the first gate and first gate dielectric layer comprise a different material than said second gate and second gate dielectric layer, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the dielectric layer, *having the materials as claimed*, since it has been held to be within the general skill of a worker in the art to

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select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Regarding claims **10 & 16**, although Wong does not teach the first gate dielectric layer comprise a different thickness than said second gate dielectric layer, the selection of thickness of various layers in device is an obvious design choice, therefore held within ordinary skills in the art.

Regarding claims **11, 14, & 18-20**, Wong discloses a transistor comprising (Fig.4g):

a channel region; a first gate on top of said channel region; a first gate dielectric below said first gate and a second gate dielectric above said second gate; a second gate below said channel region, wherein said first gate comprises a different thickness than said second gate; and an isolation layer below said second gate, wherein said first and said second gate are electrically separated from each other and said first gate, said second gate and said channel region form a planarized structure. See also the section titled *Device Fabrication* of Wong. Wong does not explicitly teach the first gate comprises a different material than said second gate. This feature is obvious for the same reasons as given for the rejection of claim 6 (See above).

6. Claims **5 & 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wong in view of Uesugi et al. (US 5,708,286).

Wong applies to claims 1 & 11 above.

Although Wong fails to teach first conductive contact of first gate and second conductive contact of second gate are coplanar, Uesugi et al teaches in Fig.1 & Col.7, lines 42-46 the first conductive contact (80) of first gate (60) and second conductive contact (90) of second gate (30) are coplanar. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Uesugi with Wong's device in order to reduce a manufacturing processing.

### ***Response to Arguments***

7. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

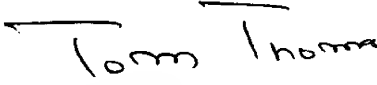
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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghee Kang whose telephone number is 703-305-9147. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Donghee Kang, Ph.D.  
January 22, 2002

  
**TOM THOMAS**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2800**